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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MIDTERM

Winter Semester: 2021 - 22

Course Code: ECE 1004

Course Name: Microprocessor Based Systems (open Elective)

Program & Sem: B.Tech & II

Date: 13/MAY/2022

Time: 01:30PM-3:00PM

Max Marks: 50

Weightage: 25%

Instructions:

Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries TWO mark.

(5Qx 2M= 10M)

1 Two's complement is a mathematical operation on binary numbers, Find 2's complement of binary number 0101 is (C.O.No.1)[Knowledge level]

2 Decimal to hexadecimal conversion is often done for the benefit of the human reader because computers can already understand any of the given number system. Find the Decimal 43 in hexadecimal and BCD number system is respectively..... and..... (C.O.No.1) [Knowledge level]

3 The microprocessor contains the arithmetic, logic, and control circuitry required to perform the functions of a computer's central processing unit. The intel 8086 microprocessor is a----- bit processor (C.O.No.1)[Knowledge Level]

4 A multiplexer combines many input signals and only one of them can be made to appear at the output. A 4 input Multiplexer would have (C.O.No.2) [Knowledge level]

5 The memory segmentation is one of the vital concept in 8086 where size of each segment is 64kb. Every segment is dedicated to special purpose like extra segment is used for string operations as destination while data segment is used as source, Name the segment which stores the instructions for the given task to be executed. (C.O.No.2) [Knowledge level]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks.

(2Qx10M=20M)

6 8086 Microprocessor is an enhanced version of 8085 Microprocessor that was designed by Intel which has 16-bit Microprocessor having 20 address lines and 16 data lines that provides up to 1MB storage. Design the major units required to build 8086 microprocessor and also describe the functions of each unit which is essential for fetching the instructions and decoding it.

(C.O.No.1) [Comprehension level]

7 If a programmer wants to access the program, which segment should he access. A particular instruction starts at an offset value of 0A45h with segment register value of 4730h. Determine the effective address and Physical address of the memory from where the instruction has to be fetched

(C.O.No.1) [Comprehension level]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries TWENTY mark.

(1Qx20M=20M)

8. Rita and Raj are some of the best performers of their class. They have scored 94 and 85 marks in course taught to them at Presidency University. Based on the data, answer the following questions with respect to binary addition and subtraction.

- i) What is the total marks scored both of them together?
- ii) If Rita's marks are subtracted from Raj's marks what is the result?
- iii) If Raj's marks are subtracted from Rita's marks what is the result?
- iv) indicate the status of SF, AF, PF, OF, CF for Question i, ii, iii.

All marks entered are hexadecimal numbers . Use Ones complement method of subtraction

(C.O.No. 2) [Comprehension level]



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ENDTERM

Winter Semester: 2021 - 22

Course Code: ECE 1004

Course Name: Microprocessor Based Systems (open Elective)

Program & Sem: B.Tech & II

Date: 1/07/2022

Time: 1:00 p.m-4:00 p.m

Max Marks: 100

Weightage: 50%

Instructions:

Read the all questions carefully and answer accordingly.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries 2 marks.

(10Qx 2M= 20M)

Q.NO.1 Mr. Marvel is working on a project assigned to him for writing and simulating an ALP using DOSBOX and MASM. While executing the same he is unable to terminate the program even after writing .end at the end of the program. Suggest one of the Software interrupts to be used in the program to solve the issue faced by Marvel

(C.O.No.1)[Knowledge level]

Q.NO.2 A processor can be operated in two modes minimum and maximum modes State the mode of the processor to be chosen in Multiprocessor configuration.

(C.O.No.1) [Knowledge level]

Q.NO.3 Binary coded decimal (BCD) is a set of binary encodings of decimal numbers where each digit is represented by a fixed number of bits, usually four or eight. It helps to compute and analyze data easily for a human being. Write the BCD equivalent for the given Decimal Number: 255

(C.O.No.1)[Knowledge Level]

Q.NO.4 While executing call and return instructions, the CS value:2000 and IP value:0FFFh are pushed to the stack. Choose correct option for the formation of Physical address and Logical address for the given CS and IP values.

(C.O.No.4) [Knowledge level]

Q.NO.5 The various addressing modes that are defined in a given instruction set architecture define how machine language instructions in that architecture identify the operand (or operands) of each instruction. There are different types of addressing modes available in 8086. Identify the addressing mode for the following instruction MOV AH, [SI]H.

(C.O.No.2) [Knowledge level]

Q.NO.6 The data transfer instructions are used to transfer data from one location to another. This transfer of data can be either from register to register, register to memory or memory to register. State one instruction that transfers the data from register to memory

(C.O.No.2) [Knowledge level]

Q.NO.7 DIV SOURCE is the syntax for division operation in 8086 give valid instruction for Division operation (C.O.No.3) [Knowledge level]

Q.NO.8 If immediate data is present in the instruction it is immediate addressing mode. The instruction, MOV AX, 35 H is an example of _____addressing mode.

(C.O.No.3) [Knowledge level]

Q.NO.9 Physical address refers to a memory address or the location of a memory cell in the main memory. The value of Code Segment (CS) Register is 4042H and the value of different offsets is as follows:BX: 2025H , IP: 0580H , DI: 4247H.Identify the EA of the code segment

(C.O.No.4) [Knowledge level]

Q.NO.10 The 8086 has four groups of the user accessible internal registers. Name the register which point to the top of the stack. Which register controls the sequence of execution of instructions

(C.O.No.4) [Knowledge level]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries 10 marks.

(4Qx10M=40M)

Q.NO. 11. The automatic floor cleaning action of dynamic mechanism and dust removal equipment is controlled by both electric circuits and multiple microprocessor chips. For the operation of functionality and practicality, an Android-based application is added to the robot with three models, including manual operation, automatic operation, and cleaning operation. For the given application

- In which mode the microprocessor should operate.
- Describe the pin configuration of the mode identified.

(C.O.No.4) [Comprehension level]

Q.NO. 12. All real mode memory addresses are a combination of a segment address plus an offset address. The starting location of a segment is defined by the 16-bit number in the segment and the offset address is a 16-bit number added to the 20-bit segment address to form the real mode memory address

- Identify the registers used to hold the offset address to fetch the data from the Data Segment.With example.
- If given 1Mbyte of memory system and memory segment length of 64K bytes. Estimate the number of segments that can be obtained from the process of segmentation.

(C.O.No.1) [Comprehension level]

Q.NO. 13. The ROR instruction stands for Rotate Right and ROL instruction stands for Rotate Left. This instruction rotates the mentioned bits in the register to the right side and left side one by one such that right and left most bit that is being rotated is again stored as the MSB in the register, and it is also stored in the Carry Flag (CF) Assume that in (AL) 55h is available then what will happen if the following instruction is executed:

- ROR AL, 02h
- ROL AL, 02h

(C.O.No.4) [Comprehension level]

Q.NO. 14. An interrupt is a condition that halts the microprocessor's current task temporarily to work on a different task and then return to its previous task. It is an event or signal that requests the attention of the CPU. Thus allowing, peripheral devices to access the microprocessor. What would be the sequence of events for the following situation considering the priority of the interrupts?
Situation: If 8086 receives NMI.

(C.O.No.4) [Comprehension level]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries 20 marks.

(2Qx20M=40M)

Q.NO. 15. Consider a decimal number 255

- a) find Hexadecimal equivalent of a given number .
- b) Find the suitable number representation to find 1's complement of hexadecimal number ,let it be X .
- c) Find 2's complement of X ,let it be Y
- d) Add X and Y and also find which flags bits are affected.

(C.O.No. 4) [Application level]

Q.NO. 16.

The programming model of the 8086 through 80286 contains 8 and 16-bit registers with 1MB of memory. Given a file containing data of student name, Roll number and marks scored by him/her in 3 subjects stored in the data segment at a location F000:1234H. The task is to find the average score of the subject and store the score in the register. Assume 8-bit hex data for the computation with flowchart or algorithm.

(C.O.No. 4) [Application level]



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(C.O.No. 2) [Comprehension level]